



United States  
General Accounting Office  
Washington, D.C. 20548

**Resources, Community, and  
Economic Development Division**

B-270178

October 27, 1995

The Honorable William V. Roth, Jr.  
United States Senate

Dear Senator Roth:

Major projects to modernize the Federal Aviation Administration's (FAA) air traffic control (ATC) system have experienced significant cost and schedule problems. FAA maintains that exemption from federal procurement laws and regulations would allow the agency to acquire and install equipment more quickly. Furthermore, FAA claims that exemption from federal personnel regulations would provide it with the flexibility to hire, reward, and relocate employees to better manage the ATC system. In response to these assertions, several congressional committees, the administration, and various segments of the aviation industry have proposed reforms for FAA that, to varying degrees, would exempt the agency from federal procurement and personnel laws and regulations. Such exemptions would allow FAA to establish its own procurement and personnel systems. This letter responds to your August 1995 request, as former Chairman of the Senate Committee on Governmental Affairs, that we provide you with information about previous work we have done that can help the Congress decide about the need for procurement and personnel reforms at FAA.

In summary, our work over the past decade does not support the conclusion that the cost and schedule problems encountered by FAA were caused primarily by federal procurement regulations. Rather, we found that these problems were caused primarily by technical and managerial factors, such as underestimating the complexity of developing systems and inadequate oversight by management. Another factor has been the lack of continuity in top management. Between 1982 and the appointment of the present Administrator, the Administrators' average tenure was less than 2 years.

FAA has taken a number of steps to improve its

acquisitions. For example, FAA has placed a greater emphasis on mission analysis to justify the need for capital expenditures. Additionally, the agency is pursuing several reengineering efforts to allow it to operate more like a business. It is too early to tell whether these initiatives will prevent the recurrence of past procurement problems.

While we have not specifically reviewed the need for personnel reforms at FAA, concerns about federal personnel rules and requirements governing employee recruitment and retention are widespread. As a general proposition, we believe that reforms to personnel authority are best approached on a governmentwide rather than agency-specific basis to ensure that the benefits of reform are broadly applied and realized.

#### DIFFICULTIES WITH THE MODERNIZATION PROGRAM

FAA's major acquisitions have experienced cost and schedule problems. Such problems have resulted from a combination of technical and managerial factors, rather than required compliance with federal procurement regulations.

##### Modernization Program Has Encountered Cost and Schedule Problems

Over the past decade, we have chronicled FAA's difficulties in modernizing the ATC system. The overall program has progressed much more slowly than expected, encountering cost growth and delays. The modernization program began in 1981 as a 10-year, \$12 billion program comprising about 80 projects. In 1991, the modernization effort was redefined as an evolving program incorporating the original projects and about 150 additional projects. Currently, the modernization program includes about 158 active projects and is estimated to cost \$37 billion between 1982 and 2003.

While FAA has completed some of the smaller projects, most major acquisitions--such as the replacement of automation and communications equipment--are still ongoing. As we recently reported, 64 projects totaling \$3.8 billion--about 10 percent of the modernization program's overall cost of \$37 billion--have been completed.<sup>1</sup> For nine major system acquisitions that we have tracked in our annual status reports, delays averaged almost 5 years. The total costs

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<sup>1</sup>Air Traffic Control: Status of FAA's Modernization Program (GAO/RCED-95-175FS, May 26, 1995).

for these nine projects have increased from \$2.66 billion to \$4.05 billion, or 65 percent. Measured on a per-unit basis, the costs of the nine projects have increased, on average, about 95 percent.<sup>2</sup>

The most visible example of FAA's problems in modernizing the ATC system is the effort to replace automation equipment in ATC facilities across the nation. The Advanced Automation System (AAS), the long-time centerpiece of the modernization program and the most costly project, was restructured last year after costs increased to an estimated \$7.6 billion from the 1983 estimate of \$2.5 billion, and the planned delivery of key components was up to 8 years behind the original 1983 schedule.

The impact of delays in the modernization program became evident recently with the breakdowns of the aging Display Channel Complex systems at some ATC centers.<sup>3</sup> This equipment would have been replaced by now if the schedule of the original AAS contract had been met. Now, under the restructured automation project, the permanent replacement equipment at these centers will become operational in 1999.<sup>4</sup> Long-awaited safety and efficiency benefits have been postponed, and FAA's credibility has been eroded. Additionally, delays in the AAS project have forced FAA to acquire interim equipment costing over \$500 million to sustain the existing ATC system.

A Complex Set of Factors Has  
Contributed to FAA's Difficulties

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<sup>2</sup>Since the original estimates, FAA changed the quantity required for seven of the nine projects. To calculate unit costs, we divided the original and current costs by the number of units--radars, sites, or facilities--scheduled to be produced under the original and current estimates.

<sup>3</sup>A Display Channel Complex (DCC) system receives data from a centralized computer network called the Host, reformats the data, and passes them to the controllers' display screens. The DCC systems were installed in the 1970s.

<sup>4</sup>The Display System Replacement equipment will provide new workstations for controllers and supporting computers at the centers. Because of problems with DCC computers at selected centers, FAA is developing an interim project--called the DCC Rehost--to support and maintain existing equipment.

FAA links cost and schedule problems with the ATC system's modernization to the agency's required compliance with federal procurement rules. FAA claims that if it is allowed to develop its own procurement system--exempt from many federal laws and regulations--the agency can avoid future cost and schedule problems and can accelerate the modernization program.

Undoubtedly, the federal procurement process can be simplified and shortened. However, our work over the past decade shows that FAA's problems with modernizing the ATC system were largely caused by other factors, such as underestimating the technical complexity of developing systems--especially highly ambitious ones like AAS that involved extensive software development. Additional factors include inadequate oversight of contractors' performance, weaknesses in justifying the need for new systems, difficulties in resolving the requirements for such systems, inadequate operational testing, and a lack of available sites for the installation of equipment.

Yet another factor has been the lack of continuity of top management. During the modernization program's first 10 years, FAA had seven different Administrators and Acting Administrators. Furthermore, between 1982 and the appointment of the present Administrator in August 1993, the average tenure for the Administrator has been less than 2 years.<sup>5</sup> FAA has also experienced a high turnover rate for its most senior acquisition executive, who is charged with overseeing acquisition policy and program execution. Since 1990, five people have held that position.<sup>6</sup>

The instability at the level of the Administrator and senior acquisition executive has fostered an organizational "culture" that has tended to focus on short-term initiatives, avoid accountability, and resist fundamental

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<sup>5</sup>The Congress has addressed this problem by requiring that all future Administrators be appointed to 5-year terms of office.

<sup>6</sup>Under the reorganization announced late last year, FAA eliminated the position of Executive Director for Acquisition and Safety Oversight. The Associate Administrator for Research and Acquisitions is now designated as the senior acquisition executive.

improvements to the acquisition process.<sup>7</sup> At the request of the Chairman of the House Appropriations Subcommittee on Transportation, we are studying the effects of the culture on FAA's acquisitions, and we plan to report the results of this review early next year.

#### IMPROVING ACQUISITION MANAGEMENT

The critical challenge facing FAA is bringing up-to-date ATC technology on-line without further delay and within budget. Our work and FAA's own internal studies have identified numerous opportunities for the agency to improve its acquisition management and thereby limit the recurrence of cost and schedule problems.

We have urged FAA to follow the businesslike principles that are outlined in its own acquisition policy. For example, the policy requires mission analysis to justify the need for new equipment. The agency did not adhere to these principles during the early stages of the modernization, but we have seen a greater emphasis on mission analysis in recent years. For example, FAA canceled the Microwave Landing System--an outdated technology--in favor of satellite-based navigation after it had reassessed its mission needs and analyzed alternative technologies.

Implementing simpler, more manageable acquisitions is one way that FAA could avoid taking on overly ambitious acquisitions. The restructured AAS project is consistent with this approach. Originally, FAA decided to replace the fundamental hardware and software in its major ATC facilities through one large project to be completed over a 13-year period. The AAS project was designed so that software developed in the initial phases would provide a platform for successive phases. After encountering numerous difficulties, the agency restructured the project in June 1994 into three smaller and separate projects for en route, terminal, and tower facilities.<sup>8</sup> In taking this action, the agency has scaled back requirements, which

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<sup>7</sup>Similar work at the Department of Defense (DOD) pointed to the culture as an underlying cause of cost and schedule problems with DOD's acquisitions. (See GAO/NSIAD-93-15, Dec. 1992.)

<sup>8</sup>These three types of facilities provide ATC services to aircraft as they pass through the national airspace system.

should reduce the complexity of software development and system integration.

Through a pilot project under the Federal Acquisition Streamlining Act of 1994 (P.L. 103-355), FAA tested alternative and innovative procurement procedures for purchasing commercially available equipment to replace aging voice recorders. FAA awarded a contract in August 1995. FAA has prepared a case study, which outlines the agency's acquisition strategy and summarizes the qualification process and evaluation methodology. According to FAA, waivers to selected statutes and other streamlining actions allowed it to award a contract rapidly and will expedite fielding the equipment. The case study also includes comments from industry and "lessons learned" for implementing acquisitions of similar size elsewhere within FAA or at other agencies. We did not assess the results of the pilot because the scope of our efforts in preparing this letter was to summarize our previous work.

Furthermore, FAA is pursuing several reengineering efforts to allow it to operate more like a business. The agency has produced a business plan for its Research and Acquisition organization. It has also established integrated product teams composed of major internal stakeholders who will be involved in decision-making during the entire life-cycle of a system. The key purposes of these actions include (1) involving customers and suppliers throughout all phases of the acquisition process, (2) controlling changes to requirements, (3) improving coordination among organizational units, and (4) enhancing oversight of contractors' software development efforts. While it is too early to tell whether FAA's initiatives will prevent the recurrence of past problems, we are encouraged by the steps the agency has begun and expect that FAA will continue to pursue these and other initiatives whether or not it is granted exemptions from procurement rules. If the Congress decides to provide these exemptions, establishing goals for FAA's new procurement system and requiring an evaluation after some period of time are important for determining the success of the effort and its governmentwide applicability.

#### DIFFICULTIES IN MANAGING HUMAN RESOURCES

FAA maintains that governmentwide personnel rules are an impediment to managing the ATC system. The agency is seeking exemptions from many of the provisions contained in title 5 of the U.S. Code that regulate the federal human

resource management system.<sup>9</sup> According to FAA, the objectives of such exemptions are to afford the agency the ability to (1) hire and fire employees as in the private sector, (2) base promotions and pay on merit, (3) provide market-based salaries designed to attract the best qualified employees within the available resources, (4) provide pay increases and other incentives to move staff to facilities that are difficult to staff, and (5) provide an opportunity for collective bargaining and other consultation with employees concerning the terms and conditions of employment. Exempting FAA from provisions of title 5 that prescribe, among other things, the manner in which federal employees are to be hired, paid, and managed would give FAA authority in the human resources area that is generally not available to federal agencies.

We have not looked specifically at the need for personnel reforms at FAA. However, concerns about federal personnel rules and requirements governing employee recruitment and retention are widespread. In our October 1995 testimony before the Subcommittee on Civil Service, House Committee on Government Reform and Oversight, we noted that the civil service system as a whole is viewed by many as burdensome to managers, unappealing to ambitious recruits, outdated, overregulated, and inflexible.<sup>10</sup> The Congress is currently considering various proposals for reforming the civil service system. We believe that reforms to personnel authority are best approached on a governmentwide rather than agency-specific basis to ensure the benefits of reform are broadly applied and realized. If the Congress decided to provide FAA with new personnel authority, the agency could be used to test reforms before they were applied governmentwide. Establishing goals prior to the application of the new authority and requiring an evaluation after some experience has been obtained are important for determining the success of the effort and its governmentwide applicability.

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<sup>9</sup>Parts II and III, Title 5, U.S. Code.

<sup>10</sup>Civil Service Reform: Changing Times Demand New Approaches (GAO/T-GGD-96-31, Oct. 12, 1995). See also Recruitment and Retention: Inadequate Federal Pay Cited as Primary Problem by Agency Officials (GAO/GGD-90-117, Sept. 11, 1990), Federal Recruiting: Comparison of Applicants Who Accepted or Declined Federal Job Offers (GAO/GGD-92-61BR, May 20, 1992), and Federal Employment: How Government Jobs Are Viewed on College Campuses (GAO/GGD-94-181, Sept. 9, 1994).

AGENCY COMMENTS

We provided a draft of this letter to the Department of Transportation and FAA for review and met with Department and agency officials--including the Director, Office of Acquisitions, FAA--to discuss their comments. These officials did not take a position with respect to our finding that the problems in modernizing the ATC system were primarily caused by technical and managerial factors and not procurement rules. They noted that our position in this letter is consistent with past reports and testimonies. They noted that both the Secretary of Transportation and the FAA Administrator continue to strongly support procurement and personnel reforms for FAA. The Director, Office of Acquisitions, noted that the discussion of FAA's pilot program under the Federal Acquisition Streamlining Act should acknowledge the agency's evaluation of the results of the pilot. We modified our report accordingly.

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A list of related GAO products is included for your information. We are sending copies of this report to the Chairman and Ranking Member of the Senate Governmental Affairs Committee; the Secretary of Transportation; the Administrator of FAA; and other interested parties. Please call me at (202) 512-2834 if you or your staff have any questions.

Sincerely yours,



John H. Anderson, Jr.  
Director, Transportation Issues

Enclosure



RELATED GAO PRODUCTS

Civil Service Reform: Changing Times Demand New Approaches (GAO/T-GGD-96-31, Oct. 12, 1995).

Federal Aviation Administration: Issues Related to FAA Reform (GAO/T-RCED-95-247, Aug. 2, 1995).

Air Traffic Control: Status of FAA's Modernization Program (GAO/RCED-95-175FS, May 26, 1995).

Air Traffic Control: Analysis of Proposal to Create a Government Corporation (GAO/T-RCED-95-139, Mar. 15, 1995).

Air Traffic Control: Issues Presented by Proposal to Create a Government Corporation (GAO/T-RCED-95-114, Feb. 23, 1995).

Federal Employment: How Government Jobs Are Viewed on College Campuses (GAO/GGD-94-181 Sept. 9, 1994).

Air Traffic Control: Observations on Proposed Corporation (GAO/T-RCED-94-210, May 12, 1994).

Advanced Automation System: Implications of Problems and Recent Changes (GAO/T-RCED-94-188, Apr. 13, 1994).

Air Traffic Control: Improvements Needed in FAA's Management of Acquisitions (GAO/T-RCED-93-33, Apr. 26, 1993).

Air Traffic Control: Uncertainties and Challenges Face FAA's Advanced Automation System (GAO/T-RCED-93-20, Apr. 19, 1993).

Federal Recruiting: Comparison of Applicants Who Accepted or Declined Federal Job Offers (GAO/GGD-92-61BR, May 20, 1992).

Recruitment and Retention: Inadequate Federal Pay Cited as Primary Problem by Agency Officials (GAO/GGD-90-117, Sept. 11, 1990).

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